Claim Amendments
Including a complete listing of all claims

1. (Currently Amended) A dental capsule providing reduced extrusion forces comprising:

a body portion having a substantially constant first inside diameter and a body portion axis;

a transition portion, adjacent said body portion, having a reducing inside diameter and a transition portion axis, said body portion axis intersecting said transition portion axis forming a body-transition angle; and

a discharge portion having a substantially constant second inside diameter, adjacent said transition portion, and having a discharge portion axis, said transition portion axis intersecting said discharge portion axis forming a transition-discharge angle,

whereby high viscosity dental material is capable of being extruded with reduced extrusion force and without damaging the high viscosity dental material.

2. (Original) A dental capsule as in claim 1 wherein:

the body-transition angle ranges between twenty-five and thirty-five degrees; and

the transition-discharge angle ranges between fifteen and twenty-five degrees.

3. (Original) A dental capsule as in claim 1 wherein:

the body-transition angle comprises substantially thirty degrees; and

the transition-discharge angle comprises substantially nineteen and one-half degrees.

4. (Original) A dental capsule as in claim 1 further comprising:

a flange attached to said body portion.

5. (Original) A dental capsule as in claim 1 further comprising:

a flexible piston.

6. (Original) A dental capsule as in claim 5 wherein:

said flexible piston is sufficiently flexible to negotiate around said transition portion.

7. (Original) A dental capsule as in claim 6 wherein:

said flexible piston comprises a cylindrical portion having a longitudinal length and a conical portion.

8. (Original) A dental capsule as in claim 7 further comprising:

a venting groove extending from said flange into said body portion the longitudinal length of the cylindrical portion of said flexible piston.

9. (Original) A dental capsule as in claim 1 wherein:

the dental capsule is made of a flexible material.

10. (Original) A dental capsule as in claim 1 further comprising:

a high viscosity dental material placed within said body portion.

11. (Original) A dental capsule as in claim 1 further comprising:

a sealing cap place on said discharge portion.

12. (Original) A dental capsule providing reduced extrusion forces for use with a high viscosity dental material comprising:

a body portion having a substantially constant inside diameter and a body portion axis;

a transition portion, adjacent said body portion, having a reducing inside diameter and a transition portion axis, said body portion axis intersecting said transition portion axis forming a body-transition angle, the body-transition angle ranging between twenty-five and thirty-five degrees; and

a discharge portion, adjacent said transition portion, having a discharge portion axis, said transition portion axis intersecting said discharge portion axis forming a transition-discharge angle, the transition-discharge angle ranging between fifteen and twenty-five degrees,

whereby high viscosity dental material is capable of being extruded with reduced extrusion force and without damaging the high viscosity dental material.

13. (Original) A dental capsule providing reduced extrusion forces for use with a high viscosity dental material as in claim 12 further comprising:

a flexible piston, said flexible piston comprising a cylindrical portion having a longitudinal length and a conical portion; and

a venting groove extending from said flange into said body portion the longitudinal length of the cylindrical portion of said flexible piston.

14. (Original) A dental capsule providing reduced extrusion forces for use with a high viscosity dental material as in claim 12 wherein:

the body-transition angle comprises substantially thirty degrees; and

the transition-discharge angle comprises substantially nineteen and one-half degrees.

15. (Original) A dental capsule providing reduced extrusion forces for use with a high viscosity dental material comprising:

a body portion having a substantially constant inside diameter and a body portion axis;

a high viscosity dental material placed within said body portion;

a flange attached to said body portion;

a transition portion, adjacent said body portion, having a reducing inside diameter and a transition portion axis, said body portion axis intersecting said transition portion axis forming a body-transition angle, the body-transition angle ranging between twenty-five and thirty-five degrees;

a discharge portion, adjacent said transition portion, having a discharge portion axis, said transition portion axis intersecting said discharge portion axis forming a transition-

discharge angle, the transition-discharge angle ranging between fifteen and twenty-five degrees;

a flexible piston, said flexible piston comprising a cylindrical portion having a longitudinal length and a conical portion;

a venting groove extending from said flange into said body portion the longitudinal length of the cylindrical portion of said flexible piston; and

a cap sealing said discharge portion,

whereby high viscosity dental material is capable of being extruded with reduced extrusion force and without damaging the high viscosity dental material.

16. (Original) A dental capsule for completely extruding a high viscosity dental material comprising:

a cylindrical body portion made of a flexible material;

a flange adjacent one end of said cylindrical body portion;

a curved discharge portion made of a flexible material adjacent another end of said cylindrical body portion, said curved discharge portion having a reducing diameter; and

a piston made of a flexible material comprising a cylindrical portion having a longitudinal length and a conical portion, the conical portion having a smallest diameter that is

larger than a smallest diameter of the reducing diameter of said curved discharge portion,

whereby said piston negotiates said curved discharge portion with reduced extrusion force and extrudes substantial all of the high viscosity dental material and said curved discharge portion and said piston are caused to change shape.

17. (Original) A dental capsule for completely extruding a high viscosity dental material as in claim 16 further comprising:

a venting groove extending from said flange into said body portion the longitudinal length of the cylindrical portion of said flexible piston;

18. (Original) A dental capsule for completely extruding a high viscosity dental material as in claim 17 further comprising:

a high viscosity dental material placed within said cylindrical body portion.

19. (New) A dental capsule providing reduced extrusion forces used in dispensing a high viscosity dental material comprising:

a body portion having a substantially constant first inside diameter and a body portion axis;

a transition portion, adjacent said body portion, having a reducing inside diameter and a transition portion axis, said body portion axis intersecting said transition portion axis forming a body-transition angle;

a discharge portion having a substantially constant second inside diameter, adjacent said transition portion, and having a discharge portion axis, said transition portion axis intersecting said discharge portion axis forming a transition-discharge angle;

wherein the body-transition angle ranges between twenty-five and thirty-five degrees and the transition-discharge angle ranges between fifteen and twenty-five degrees;

a high viscous dental material placed within said body portion; and

a piston having a flexible conical front portion with a small diameter placed within said body portion, wherein the small diameter of said piston is smaller than the diameter of the substantially constant second inside diameter of said discharge portion,

whereby the flexible conical front portion is sufficiently flexible to negotiate around said transition portion and said high viscosity dental material is capable of being extruded with reduced extrusion force and without damaging said high viscosity dental material.

REPLY

The Examiner rejected claims 1 and 4 under 35 USC §102(b) as being clearly anticipated by Stefaniak et al. The Examiner further rejected claims 1, 4-7, 9 and 10 under 35 USC §102(b) as being clearly anticipated by Drumm. The Examiner further rejected claims 1, 4-7, 9-11, and 16 under 35 USC §102(b) as being clearly anticipated by Discko, Jr.

The Examiner rejected claims 2, 3, 12, and 14 under 35 USC §103(a) as being unpatentable over Stefaniak et al. The Examiner further rejected claims 2, 3, 12, and 14 under 35 USC §103(a) as being unpatentable over Drumm. The Examiner also rejected claims 2, 3, 12, and 14 under 35 USC §103(a) as being unpatentable over Discko, Jr. The Examiner rejected claims 8, 13, 15, 17, and 18 under 35 USC §103(a) as being unpatentable over Discko, Jr. in view of Dragan, et al.

Stefaniak et al discloses a formed tip attached to a dispenser. Stenfaniak et al discloses a body 22 for releaseably receiving an enlarged, annular mating shoulder 66 formed at a longitudinal end 68 of the formed tip 34. The snap fit between the shoulder 66 and the groove 62 effects the releaseable engagement between the body 22 and the formed tip 34. Therefore,

the formed tip 34 only has two sections, both of which have a reducing diameter. The discharge portion has a reducing diameter.

Therefore, the formed tip disclosed in Stefaniak et al is not generally applicable to the dispensing of highly viscous dental materials. As indicated in the application on page 2, many dental composite materials become too viscous for easy dispensing with prior capsules or tips. The force required to dispense high viscosity dental composite materials often makes their placement difficult for the dentist. Additionally, capsule designs that require high extrusion forces may damage or change the physical properties of the dental composite material. Stefaniak et al does not address any of these problems and, therefore, is silent on any possible suggestion as to a solution.

Drumm discloses a dental material carrier and applicator having a ball shaped applicator at the discharge end. In one embodiment, Drumm discloses a nozzle 13 that tapers inwardly toward a discharge orifice 14. In another embodiment, a body portion 21 having a hemispherical end is connected to a nozzle 26 at an angle. The ball applicator is used to work the dental material. The embodiment illustrated in Fig. 2 has a continuously tapering nozzle 13 and the embodiment illustrated in Fig. 4 does not have any transition portion between the body and the discharge portion.

Discko, Jr. discloses dental cartridges having either a continuous taper, two axes, or a toroidal segment and coaxial nozzle. Discko, Jr. specifically teaches that the toroidal segment and coaxial nozzle embodiment improves the visibility and the material flow within the cartridge over that of more complex or two axes cartridges. *Discko, Jr., column 6, lines 18-20.*

Claim 1 has been amended to recite that the discharge portion has a substantially constant second inside diameter adjacent the transition portion. Therefore, as recited in claim 1, the body portion has a constant first inside diameter, which is adjacent to a transition portion having a transition portion axis intersecting the body portion and the discharge portion having a substantially constant second inside diameter having an axis intersecting the transition portion axes. Accordingly, a dental capsule having three different axes in combination with a body portion and a discharge portion, each having different constant inside diameters, is claimed. Therefore, the present invention, as claimed in amended claim 1, has a structure that is not disclosed in the references cited by the Examiner, in particular Stefaniak, et al, Drumm, and Discko, Jr.

The claimed invention is particularly adapted to more easily extrude highly viscous dental material. Most of the prior art references cited by the Examiner are not concerned with the dispensing of highly viscous dental materials and therefore

utilize shapes that would not function well, if at all, when used with highly viscous dental materials. Extrusion forces placed on the highly viscous dental materials may cause the dental materials to alter their properties, compromising their effectiveness. The problem of material flow or material properties is not disclosed or mentioned in most of the prior art references cited by the Examiner. The only reference believed to teach improving material flow in a dental cartridge is Discko, Jr. To solve these material flow difficulties, Discko, Jr. taught a solution that utilizes a toroidal shaped capsule having a common curved longitudinal axis. In so teaching, Dicko, Jr. taught away from the more complex shapes and two axes cartridges of the prior art. Accordingly, these teachings led away from the introduction of multiple axes cartridges. However, as indicated in the present application on page 6, it has been discovered that the shape of the dental capsule of the present invention reduces the extrusion forces by as much as twenty percent in relation to other capsules. Therefore, claim 1 as amended is not anticipated by the references cited by the Examiner.

Additionally, claims 2 and 3 recite specific angular limitations between the body-transition angle and the transition-discharge angle. None of the references cited by the Examiner teach any desired angle. Therefore, there could be no motivation whatsoever to establish or determine where in a previously

undisclosed range would be an optimum working range. There is no general condition that relates to a range of angles disclosed in the prior art. There would be no basis to provide any motivation to determine where in a range would be optimized, when there is no disclosure of a range.

Even if some range were disclosed in the prior art, the Applicant has discovered that the claimed range in combination with the structure of the capsule, unexpectedly provides superior results in reducing extrusion forces by as much as twenty percent. Therefore, these unexpected results in improved performance clearly are not disclosed or suggested by the references cited by the Examiner, and would therefore obviate any prima facie case of obviousness that might have been established.

There is nothing cited in the prior art, other than as previously mentioned with respect to Discko, Jr., that even relates to obtaining improved flow. Therefore, there is no support to establish that the angular positioning of the various portions of the capsule would be recognized as a variable which would achieve any particular result. Therefore, there would be no basis to motivate one skilled in the art to experiment in order to obtain a workable range. Since the prior art did not recognize the angle parameter to be a result-effective variable, it cannot be utilized to establish a prima facie case of obviousness based on the optimization of routine experimentation. Claims 2 and 3 in

reciting specific angular relationships between the three axes of the capsule should therefore be allowable.

Claim 12 also recites specific body transition angle ranges and transition-discharge angles that achieve unexpected results in substantially reducing the extrusion forces require. The angle parameter range is not obvious in view of the prior art and the failure in the prior art to recognize the parameter or any teaching or suggestion that the parameter would have any substantial influence on the extrusion forces of highly viscous dental material. Therefore, claim 12 is not obvious in view of the references cited by the Examiner, and should also be allowable.

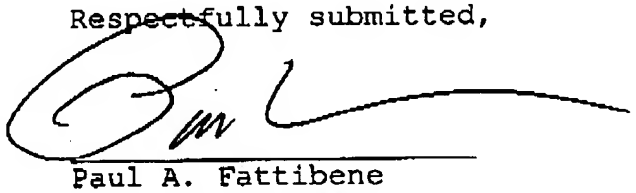
Claim 16 recites the combination of a body portion made of a flexible material and a piston made of a flexible material that has a conical portion having a small diameter that is larger than the smallest diameter of the reduced diameter of the curved discharge portion. Discko, Jr. does not disclose a curved body portion and a curved discharge portion made of a flexible material in combination with a piston made of a flexible material having a conical portion having a small diameter that is larger than the smallest diameter of the reduced diameter of the curved discharge portion. Accordingly, claim 16 permits the extrusion of substantially all of the high viscous dental material due to the curved discharge portion and permits an effective seal between

the piston and the curved discharge portion due to the flexible nature of the combination of materials to prevent leakage. In the use of highly viscous dental materials leakage is often a problem due to the high extrusion forces generally required. The relationship of the conical portion having a small diameter that is larger than the smallest diameter of the reduced diameter of the curved discharge portion is not disclosed by Discko, Jr., therefore claim 16 cannot be anticipated by Discko, Jr. and should be allowable.

New claim 19 has been added.

It is respectfully requested that the Examiner reconsider the present application and forward the Notice of Allowance.

Respectfully submitted,



Paul A. Fattibene
Reg. No. 31,694

2480 Post Road
Southport, CT 06890
Tel. 203-255-4400
Fax 203-259-0033

March 3, 2004